Department of Chemistry & Physics
PHYS 2030 GENERAL PHYSICS

PHYS 2030. GENERAL PHYSICS. (3-3-0). Fundamental laws of mechanics, heat and sound. Prerequisites: registration in or credit for 2031; Mathematics 1090.

Text Physics, 4th Ed., James S. Walker, Pearson/Addison-Wesley

Course Content

1. Introduction
    a. Units, significant figures, unit conversions
2. One-Dimensional Kinematics
    a. Displacement, velocity, acceleration
    b. Equations of kinematics
3. Two-Dimensional Kinematics
    a. Vectors
    b. Projectile motion
4. Newton's Laws of Motion
    a. $\mathbf{\Sigma F} = m\mathbf{a}$, definitions of force and mass
    b. Normal, frictional and tension forces
    c. Circular motion
5. Work and Energy
    a. Work-energy theorem
    b. Conservation of mechanical energy
    c. Non-conservative forces
6. Linear Momentum
    a. Impulse-momentum theorem
    b. Conservation of momentum, collisions
7. Rotational Kinematics, Statics and Dynamics
    a. Angular displacement, velocity, acceleration, momentum
    b. Rotational kinetic energy and moment of inertia
    c. Torque, static equilibrium
8. Wave phenomena & other bulk matter properties
    a. Simple harmonic oscillator and springs
    b. Sound & interference as wave phenomena
    c. Miscellaneous topics on thermal physics

Course Goals

This course is intended:

1. To acquaint the student with the incredibly diverse set of physical phenomena that can be described with careful application of Newton's laws.
2. To instruct the student in the application of Newton's laws and abstract mathematical ideas from trigonometry. Algebra and geometry to solving problems, both practical and philosophical.
3. To expose the student to some of the drama and grandeur associated with the history of physics, science and knowledge – in particular, how these ideas are responsible for much of the growth of technology, both in the past and today.
4. To improve the student's critical reading skills, reasoning ability and descriptive writing skills.

Course Objectives

The student who successfully completes this course should be able:

1. To apply Newton's laws of dynamics (including the work-energy theorem and the impulse-momentum theorem) to objects interacting mechanically and/or gravitationally in order to predict and analyze their motion.
2. To explain under what circumstances one expects Newton's laws, the work-energy theorem and the impulse-momentum theorem to hold, and to give operational definitions and/or formal mathematical definitions for all of the quantities appearing in these famous empirical laws.
3. To write original, coherent prose conveying knowledge about physical phenomena – knowledge obtained both through reading and through experiential learning.
4. To state essential kinematic results and definitions from the study of motion with constant acceleration, simple harmonic motion and circular motion.
5. To exhibit knowledge of many of the paradigms of physics applications including the atomic model of matter, planetary orbits and gravitation, wave behavior in solids and fluids, macroscopic collisions, and some understanding of the history of physics.
6. To critique science prose and/or analyses using such techniques as dimensional analysis, informal logic, and comparison to personal experience and knowledge of experimental data.

It is the policy of NSU to accommodate students with disabilities, pursuant to federal law, state law, and the University's commitment to equal educational opportunities. Any student with a disability who needs accommodation, for example in seating placement or in arrangements for examinations, should inform the instructor at the beginning of the course. Students with disabilities are encouraged to contact Disability Services, which is located in Kyser Hall, room 237, telephone 357-6950 or (TTD) 357-4393 or disability@nsula.edu.